

List of Figures

Figure 1. Map showing historic (1984-2001) and recent (2002-2004) bay grass coverage in the Patuxent River and a graph of the variation in total bay grass acreage in the mesohaline portion of the Patuxent River from 1984 to 2004.

Figure 2. SAV habitat requirements in the Patuxent River. Each panel shows the status (pass/fail) of a particular requirement based on the requirements for SAV growth in the Chesapeake Bay and its tributaries (Batuik et al. 1992). A) Dissolved inorganic nitrogen (DIN), B) Dissolved inorganic phosphorus (DIP), C) Total suspended solids (TSS), D) Chlorophyll a, and E) K_d (light attenuation coefficient).

Figure 3. SAV restoration potential map of the Patuxent River, MD based on MD-DNR GIS based targeting model.

Figure 4. Map of Patuxent River, MD with restoration locations: Parrans Hollow (PH), Jefferson Patterson Park (JPP), Hungerford Creek (HC), Myrtle Point (MP), and Solomons Island (SI).

Figure 5. *Zostera marina* reproductive material collection 2003-2005. A) Map showing harvesting locations, B) Harvesting location near Smith Island in 2003, C) Harvesting locations near the Little Annemessex River in 2003 and 2004 and the Little Annemessex River and the mouth of Acre Creek in 2005, D) Mechanical harvest machine, E) MD DNR biologists unloading reproductive material from harvest boat, and F) MD DNR biologists and volunteers packing harvested material into mesh bags for transport.

Figure 6. A) Single spring seed bag with attached cinderblock, B) Double spring seed bag with attached cinderblock, C) Spring seed bag deployment, and D) Spring seed bag floating freely after deployment.

Figure 7. A) Manual fall seed broadcast method used in 2003, and B) Mechanical fall seed broadcast apparatus utilized during 2004 and 2005.

Figure 8. 25 meter radius (1/2 acre) plot divided into 5 meter concentric increments to ensure uniform distribution of seeds. The percent (%) of total area was used to determine the amount of seed material to be used in each 5 meter increment.

Figure 9. Patuxent River test plot success from May and July 2005 surveys. Adult *Z. marina* plants were transplanted into three - 1 m² test plots located adjacent to fall seed broadcast or spring seed bag areas at Parrans Hollow, Hungerford Creek, and Solomons Island on November 18, 2004. A density of 64 adult plants per m² was used for each test plot.

Figure 10. Map detailing seeding activity at each of five Patuxent River restoration locations: Parrans Hollow (PH), Jefferson Patterson Park (JPP), Hungerford Creek (HC), Myrtle Point (MP), and Solomons Island (SI) (2003-2005).

Figure 11. Map detailing seeding activity at the Parrans Hollow restoration location (2004).

Figure 12. Map detailing seeding activity at the Jefferson Patterson Park restoration location (2003-2005).

Figure 13. Map detailing seeding activity at the Hungerford Creek restoration location (2004-2005).

Figure 14. Map detailing seeding activity at the Myrtle Point restoration location (2004-2005).

Figure 15. Map detailing seeding activity at the Solomons Island restoration location (2004).

Figure 16. Success of the 2004 spring seed bag dispersal effort on the Patuxent River surveyed in May 2005. A) Number of seedlings observed per acre at each seed bag location (Number of seedlings observed = number of seedlings along the area of the survey transect * the total area of the seeded plot), and B) Initial planting success at each location (Initial planting success = total number of seedlings observed/the total number of seeds broadcast).

Figure 17. A continuous monitoring station was located at the Chesapeake Biological Laboratory dock near the Solomons Island restoration site on the Patuxent River to provide temporally intensive habitat assessments prior to and during restoration (2003-2005). Temperature and turbidity are presented for A) 2003, B) 2004, and C) 2005. The red line indicates a turbidity value of 5.38, the water clarity target for SAV that corresponds to 22% light penetration to a depth of 1m in the Patuxent River.

Figure 18. A continuous monitoring station was located at the Pin Oak Farm near the Jefferson Patterson Park and Parrans Hollow restoration sites on the Patuxent River to provide temporally intensive habitat assessments prior to and during restoration (2003-2005). Temperature and turbidity are presented for A) 2003, B) 2004, and C) 2005. The red line indicates a turbidity value of 5.38, the water clarity target for SAV that corresponds to 22% light penetration to a depth of 1m in the Patuxent River.

Figure 19. Turbidity data (NTU) from DATAFLOW cruises from April to October 2003 on the Patuxent River. DATAFLOW, a shipboard system of geospatial equipment and water quality probes, measures five water quality parameters from a flow-through stream of water collected near the water's surface.

Figure 20. Turbidity data (NTU) from DATAFLOW cruises from March to November 2004 on the Patuxent River. DATAFLOW, a shipboard system of geospatial equipment and water quality, probes measures five water quality parameters from a flow-through stream of water collected near the water's surface.

Figure 21. Turbidity data (NTU) from DATAFLOW cruises from April to September 2005 on the Patuxent River. DATAFLOW, a shipboard system of geospatial equipment and water quality probes, measures five water quality parameters from a flow-through stream of water collected near the water's surface.

Figure 22. Secchi depth data for 2003, 2004, and 2005 compared to the range and mean of historical secchi depth values from 1985-2002 at three locations in the Patuxent River: Saint Leonard, Point Patience, and Drum Point.

Figure 23. Total suspended sediments (TSS) data for 2003 and 2004 compared to the range and mean of historical TSS values from 1985-2002 at three locations in the Patuxent River: Saint Leonard, Point Patience, and Drum Point.

Figure 24. Temperature data for 2003 and 2004 compared to the range and mean of historical TSS values from 1985-2002 at three locations in the Patuxent River: Saint Leonard, Point Patience, and Drum Point.